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Title	DESCRIPTION OF A NEW BRANCHIOBDELLID, Carcinodrilus nipponicus n. g. et n. sp. (With 1 Plate and 2 Text-figures)
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Citation	北海道帝國大學理學部紀要, 2(1), 61-67
Issue Date	1932-09
Doc URL	https://hdl.handle.net/2115/26948
Type	departmental bulletin paper
File Information	2(1)_P61-67.pdf

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DESCRIPTION OF A NEW BRANCHIOBDELLID, *Carcinodrilus nipponicus* n. g. et n. sp.[1)]

By

Hideji YAMAGUCHI

(*With 1 Plate and 2 Text-figures*)

While examining a rich find of branchiobdellid worms attached to *Cambaroides japonicus* collected at Soranuma and Makomanai, both near Sapporo, I happened to come across some interesting worms, which are quite like *Ceratodrilus* but devoid of trunk appendages. They were found together with other branchiobdellids belonging to *Ceratodrilus* and other genera, and at first appeared to me to be examples of developmental stages or aberrant individuals of *Ceratodrilus*. But these worms seem to be adult form, because some of them have perfectly mature spermatozoa and ova (Pl. III, fig. 7). On the other hand, *Ceratodrilus cirratus* and *C. Uchidai* always have trunk appendages in any larval stage and moreover the young worm of the former newly hatched out from a cocoon, is still furnished with the trunk appendages (Pl. III, fig. 2). Besides, there was found no individual which assumed intermediate form between these worms and the two species of *Ceratodrilus*. From the facts above mentioned, it is clear that the specimens are quite different from *Ceratodrilus*, and they seem to me to belong to a new genus as will be described later on.

Here I wish to express my deep gratitude to Prof. Dr. TOHRU UCHIDA for his valuable suggestions and help rendered during the present study and also to Prof. Dr. K. OGUMA and Prof. Dr. T. INUKAI for their kind advice in various ways.

1) Contribution No. 33 from the Zoological Institute, Faculty of Science, Hokkaido Imperial University, Sapporo.

Carcinodrilus nov. gen.

Head distinct, easily distinguishable from the trunk. Anterior outer border of the head extended to form a membraneous funnel-like expansion around the mouth. Anterior margin of the dorsal and lateral portions of the funnel incised to form several digitiform lobules or appendages. No trunk appendage in any segment. Testes

TABLE 1.

	Ceratodrilus	*Carcinodrilus*	*Stephanodrilus*	*Pterodrilus*
Head	distinct.	distinct.	distinct.	rather obscure.
Head appendages	present, with membraneous connection between them.	present, with membraneous connection.	present, without membraneous connection.	absent.
Trunk appendages	present.	absent.	absent.	present.
Dental plates	similar or slightly dissimilar.	slightly dissimilar.	similar.	similar or slightly dissimilar.
Openings of anterior nephridial pores	separated at least in *C. ciratus* and *C. Uchidai*.	separated.	separated in *S. sapporensis* in the author's specimens.	?
Testes and funnels	2 pairs.	2 pairs.	2 pairs.	2 pairs.
Spermatheca	tubular to flask-shaped, not bifid.	tubular, not bifid.	tubular, not bifid in *S. sapporensis* in the author's specimens.	tubular in *P. durbini*, not bifid.
Spermathecal pore	opens on a papilla.	opens on a papilla.	lacks conspicuous papilla.	opens on a papilla (?).

and funnels paired in the trunk segments V and VI. Spermatheca tubular, not bifid. Anterior nephridial pores separately open.

Remarks. The genus is similar to the genus *Ceratodrilus* in the possession of a membraneous portion of the head which is incised to form several digitiform appendages in the anterior margin, but it differs from the latter in the lack of trunk appendages. In *Stephanodrilus* the head is provided with several lobules or appendages, but no membraneous connection occurs between them. Moreover, the spermathecal pore of the genus does not open on conspicuous papilla. Except for these characters above given, the internal structure of the new genus is generally similar to *Ceratodrilus* and *Stephanodrilus*. Therefore, it seems to me that these three genera are most closely related in the Branchiobdellidae. Though somewhat different in head structure, *Pterodrilus* also seems to stand more or less close in systematic position to these genera on account of the presence of the dorsal appendages and some internal characters. In Table 1., the important characteristics of the four genera, *Stephanodrilus, Carcinodrilus* n. g., *Ceratodrilus* and *Pterodrilus* are given. As is clear from the table, the present genus seems to be situated between *Ceratodrilus* and *Stephanodrilus* in several morphological respects.

Carcinodrilus nipponicus nov. sp.

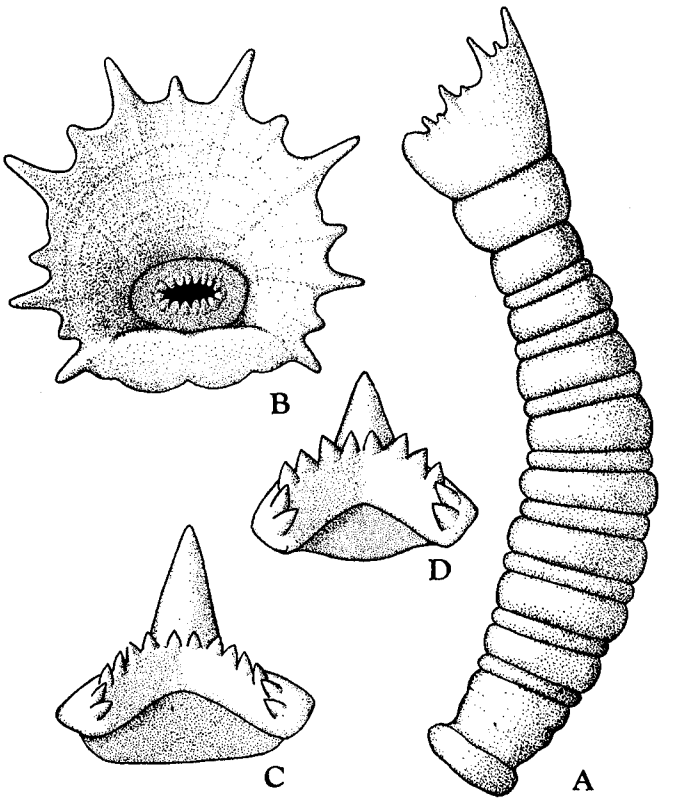
(Pl. III, figs. 1, 3–7; Text-figs. 1, 2)

The body is cylindrical, terminated anteriorly by the so-called head and posteriorly by the sucker, 2 mm long and 0.4 mm wide in the widest portion about trunk segments V-VII, in a mature worm. The head is easily distinguishable from the trunk.[1] The anterior outer border of the head is prolonged making a membraneous funnel-shaped expansion which surrounds the mouth deep at the bottom (Text-fig. 1, B; Pl. III, fig. 3). The dorso-lateral mar-

1) In *Bdellodrilus illuminatus* and other branchiobdellids, the head is less sharply distinguishable externally.

gins of the funnel are thinner than the ventral one which is, though not sharply, bilobed; the anterior margin of the dorsal and lateral portions of the funnel are divided into 15 digitiform lobules or appendages,[1] of which 8 are long and 7 are short. These appendages, long and short, alternate with each other (Text-fig. 1, B). Among the long appendages the dorsal 4 are more or less larger

Text-fig. 1.

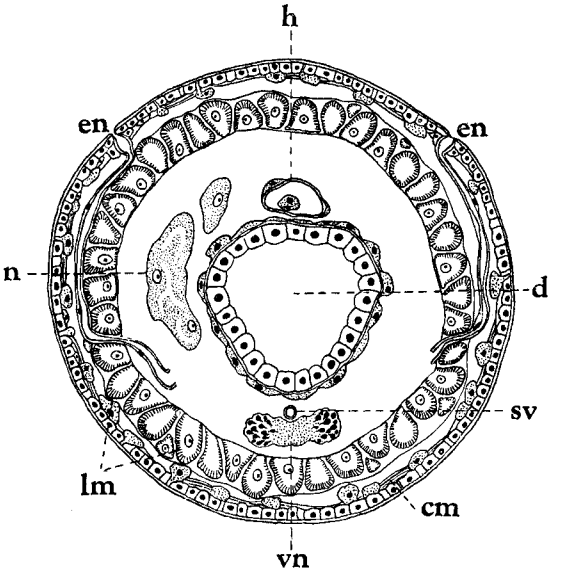


Text-fig. 1. *Carcinodrilus nipponicus* nov. gen. et nov. sp. A, lateral view × 50; B, oral view of the head × 75; C, D, anterior view of dental plates × 1000; C, dorsal plate; D, ventral plate.

1) There are 13 digitiform appendages in *Ceratodrilus cirratus* and *C. Uchidai.*

than the rest. The mouth is provided with a fleshy ring with a circlet of 16 minute papillae inside of the base of the funnel (Text-fig. 1, B). Unlike *Ceratodrilus cirratus,* there are no supraoral papillae present. Both the dorsal and ventral dental plates are brown in colour and of slightly dissimilar form, the dorsal one being larger than the ventral (Text-fig. 1, C, D). The teeth of these plates are also brown in colour. There are in the dorsal plate a median large and a series of 14 small teeth, and in the ventral plate a median large and 12 small ones. The median tooth of the dorsal plate is larger than that of the ventral, while the dorsal small teeth are slightly smaller than the ventral ones. The trunk region consists of 11 segments; out of them the 8 anterior ones are each dis-

Text-fig. 2



Text-fig. 2. *Carcinodrilus nipponicus* n. g. et n. sp.; semidiagrammatic figure of transverse section through the trnnk segment III. cm, circular muscle; d, digestive tract; en, external aperture of nephridium; h, heart; lm, longitudinal muscle; n, nephridium; sv, supraneural blood vessel; vn, ventral nerve cord.

tinctly composed of a minor and a major annulation, while the 3 posterior are smaller and in their annulation less distinct than the former. The last segment transforms into a sucker. Unlike *Ceratodrilus* and *Pterodrilus*, the species is destitute of trunk appendages. The speramathecal pore opens on a slightly elevated papilla in the mid-ventral line in the trunk segment V (Pl. III, fig. 5) ; the male sexual aperture is similarly located in the trunk segment VI (Pl. III, fig. 5). The oviduct-pores are paired, situated on the ventro-lateral side and between the major and minor annulations of the trunk segment VII (Pl. III, fig. 7). The anus is present on the mid-dorsal line of the trunk segment X, as in usual case in the Branchiobdellidae. The anterior nephridial pores are located in pair on the dorso-lateral side of the major annulation in the trunk segment III (Text-fig. 2). The opening of the posterior nephridial pores could not be found in sections and preparations *in toto*. There is no salivary gland in the species, though J. P. MOORE (1895) described it in *Bdellodrilus illuminatus*. The digestive tract runs almost straight from the mouth to the anus. Two pharyngeal diverticula, one dorsal and the other ventral, are present (Pl. III, fig. 4). The spermatheca is tubular, not bifid. The testes and funnels are paired in the trunk segments V and VI. The ovaries are located in pair in the trunk segment VII.

The species is not rare on the Japanese crayfish, *Cambaroides japonicus*, which harbours usually at the same time several other species belonging to the Branchiobdellidae.

Localities. Soranuma and Makomanai, both in Hokkaido.

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PLATE III

Explanation of Plate III

1. Dorsal view of *Carcinodrilus nipponicus* nov. gen. et nov. sp. × 25.

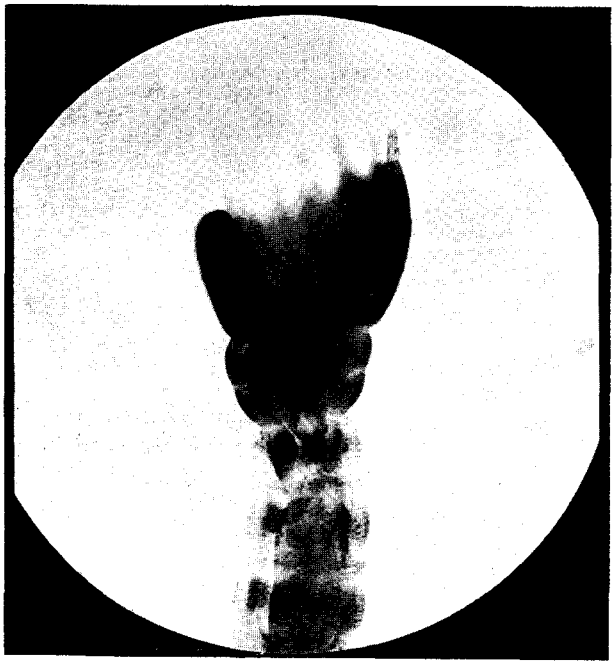
2. Young specimen of *Ceratodrilus cirratus* (PIERANTONI), fixed immediately after hatching out from a cocoon × 25.

3. Lateral view of anterior part of *Carcinodrilus nipponicus* nov. gen. et nov. sp., from a total preparation × 65.

4.–7. Longitudinal sections of the same species × 100; 4, anterior part; 5–7, about genital segments, (in 6, male copulatory organ has been obliquely sectioned).

Abbreviations

a, atrium; d, dental plate; ds, spermatozoa in different developmental stages; dt, digestive tract; g, ganglion; lm, longitudinal muscle; m, male sexual aperture; o, ovary; op, oviduct pore; p, penis; phd, pharyngeal diverticulum; pv, a piece of ventral dental plate; ro, ruptured ovum; sp, spermathecal pore; sv, supra-neural blood vessel; vn, ventral nerve cord.



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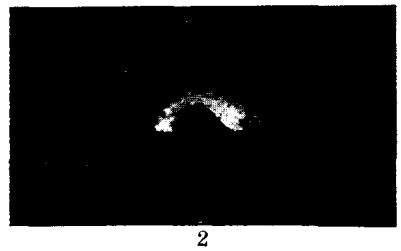

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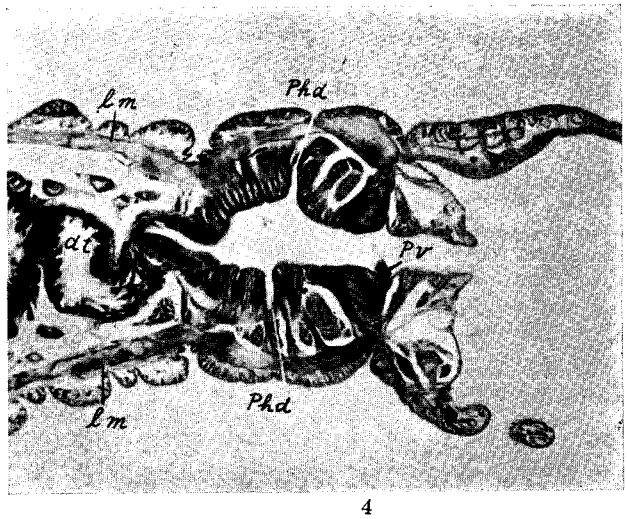

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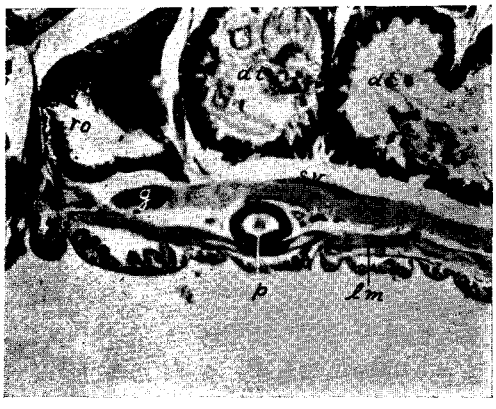

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Yamaguchi Photo.

H. Yamaguchi: Description of a New Branchiobdellid.